

Operating Instructions for Digital-Manometer

**Model: MAN-SD
MAN-LD**



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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit MAN-LD / MAN-SD should be used only when the machines fulfil the EEC-machine guidelines.

3. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition.

Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:

The standard delivery includes:

- Digital Manometer with LCD-Display model: MAN-SD / MAN-LD
- Operating Instructions
- only MAN-SD: 9 V –block battery (IEC 6 LR 61)

4. Regulation Use

The models MAN-LD /MAN-SD are used for the measuring, monitoring and remote transmission of pressure-dependent operating sequences in machines and installations.

These devices are equipped as follows:

- 4-digit LCD display
- three programming keys
- process connection made of stainless steel
- limit relays (option)
- peak value memory
- analogue output (option)
- only MAN-SD : power supply by 9 V –block battery
- only MAN-LD : power supply by 24 VDC external

When used in machines, the measuring unit MAN-LD / MAN-SD should be used only when the machines fulfil the EEC-machine guidelines.

5. Operating Principle

The pressure to be measured is sensed by a ceramic sensor and displayed by the electronics. As an option, an analogue output signal for remote transmission of the measured values and a relay output are available.

6. Mechanical Connection

Before installation:

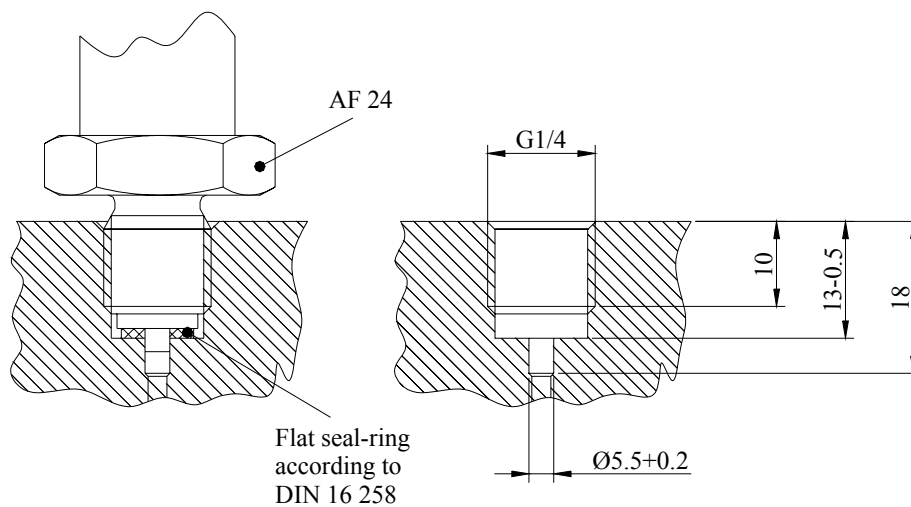
- Ensure that the max. pressure in your system is within the prescribed range of the digital manometer. The measuring range can be read from the nameplate label of the device.
- Make sure that the permitted max. operating temperature of the device is not exceeded.
- Remove all packing materials and ensure that no such materials remain in the device.

Installation:

- Ensure that the piping is fully depressurised.
- The digital manometer should be mounted just like a mechanical manometer.
- With standard thread connection, sealing is achieved by means of a suitable gasket (flat-seal or seal-ring according to DIN 16258).
- While threading in the device, install on the hexagonal screw (AF 24) and not the gauge housing. Only use a wrench for mounting!
- If possible, after the mechanical installation, pressure test the piping to determine whether the connection joint is adequately sealed.



Attention! The mounting of the device has to be carried out within a metallic fitting or vessel which must be connected to a potential equalisation. This action is necessary in order to fulfil the EMV-guideline.



7. Electrical Connection



Attention!

Incorrect wiring will lead to damage of the unit's electronics.

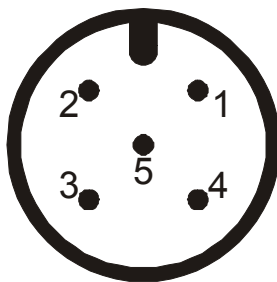
7.1 Connection for MAN-LD

- Make sure that the supply wires are de-energized.
- Plug in the system according to the connecting diagrams.
- Power supply conductor (area of cross-section) min. 0.34 mm².

Pin assignment

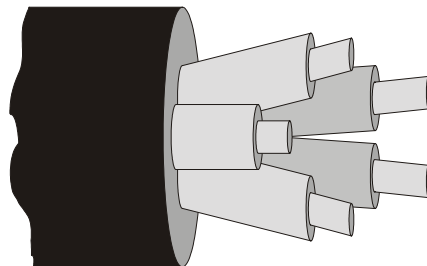
Contact-No.	MAN-LD1...	MAN-LD2...	MAN-LD3...	Cable colour
1	+V _S / 24 V _{DC}	+V _S / 24 V _{DC}	+V _S / 24 V _{DC}	brown
2		N/O contact		white
3	GND	GND	GND	blue
4			analogue output 4-20 mA	black
5		N/O contact		grey

Plug M12x1



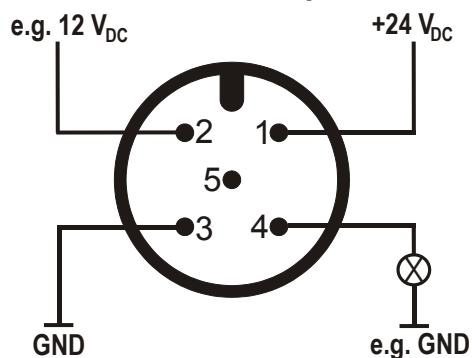
View on plug
contacts

5-core Cable.



Cable wires
colour-coded

Connection example



The N/O contact is a potential-free relay which can be operated within its maximum switching values.

The shown assignment of 12 V_{DC} (connection 2) and GND (connection 5) is only to be understood as an example.

7.2 Connection for MAN-SD

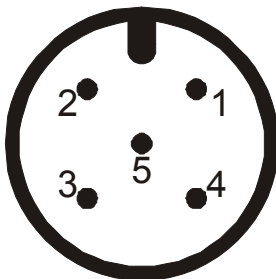


Attention! Please ensure that you use a 9 V – alkali-manganese-block battery (IEC 6 LR 61).

- Make sure that the supply wires are de-energized.
(Only with option limit contact or analogue output)
- Open the battery enclosure on the back-side of the unit and connect the 9V block battery with the connection plug.
- Place the 9V block battery in the enclosure and close it with the lid.
- Terminate the connection wires on the plug (cable), as shown in the illustration below. (Only with option limit contact or analogue output.)
- Power supply conductor (area of cross-section) min. 0.34 mm².

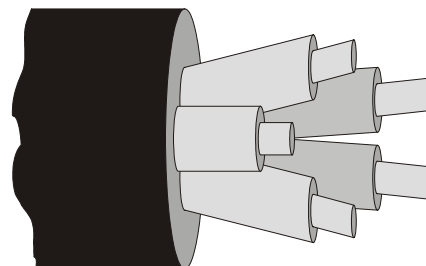
Contact-No.	MAN-SD2...	MAN-SD3...	Cable colour
1			brown
2	N/O contact		white
3		GND (0 V reference)	blue
4		analogue output 0-2 V _{DC}	black
5	N/O contact		grey

Plug M12x1



View on plug contacts

5-core Cable.



Cable wires colour-coded

8. Function Keys

For the selection of menu options, the following functions keys are available:

for MAN-LD

↓	next menu option
↑	previous menu option
↓ → P	jump to the function

for MAN-SD

↓	next menu option
↑	previous menu option
P	1 x press to switch-on
P	1 x press to switch-off
↓ → P	jump to the function

Adjustments and function:

↑	Value-adjustment upwards
↓	Value-adjustment downwards
P	Enter value and jump to next menu option
↑ & ↓	Reject input, return to menu option

9. Adjustment

Possible adjustments of the device:

1. zero point
2. password (factory pre-set: 5)
3. peak value memory
4. relay (option) with settable hysteresis
5. (factory pre-set: switching point on 50% of measuring range)

Factory pre-sets:

for MAN-LD

1. sampling rate (default: 5 measurements per second)
2. analogue output linear zum Messbereich 4...20 mA (option)

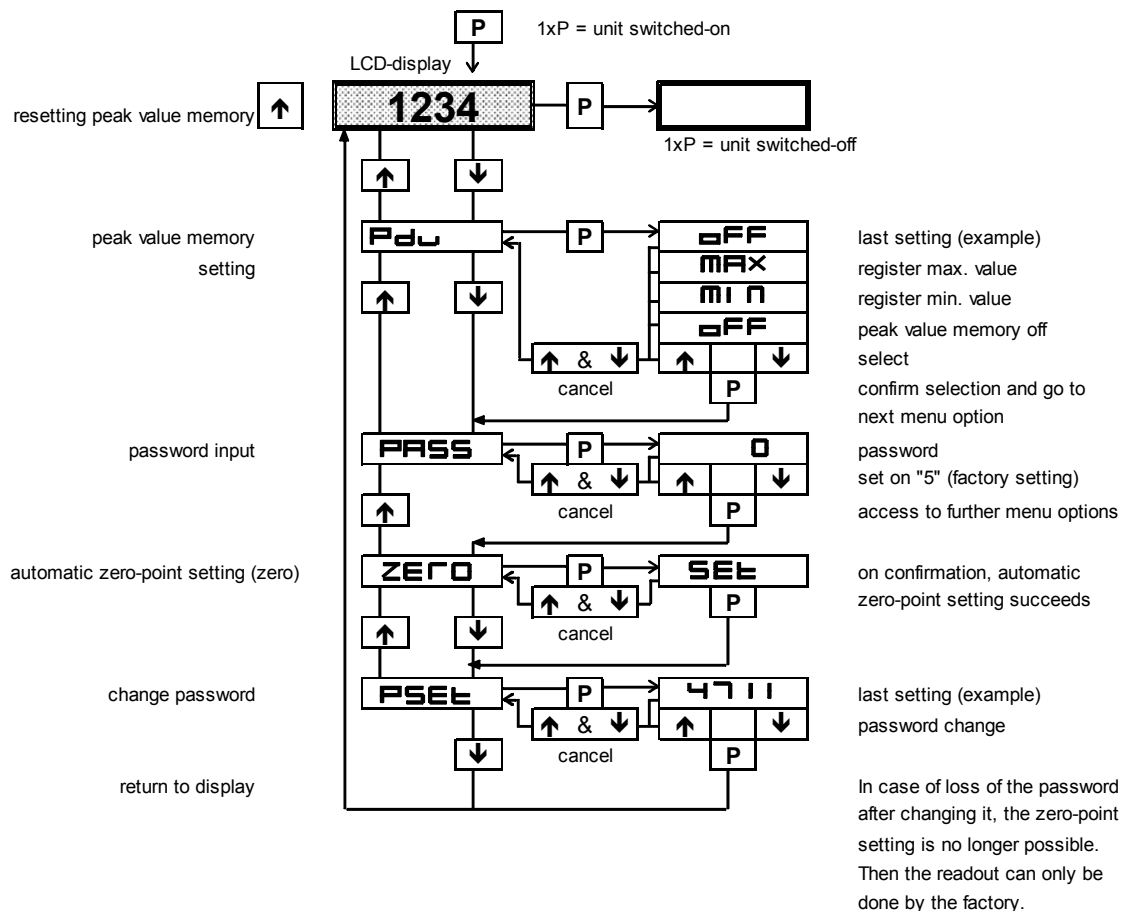
for MAN-SD

1. battery symbol on: voltage under 6,5 V
2. switch-off delay (default: 0 = inactive)
3. sampling rate (default: 5 measurements per second)
4. analogue output (linear) within measuring range 0...2 VDC (option)

10. Control Functions

10.1 Control function for MAN-LD

**Unit with peak value memory MAN-LD1S...and
unit with peak value memory + analogue output MAN-LD3S...**

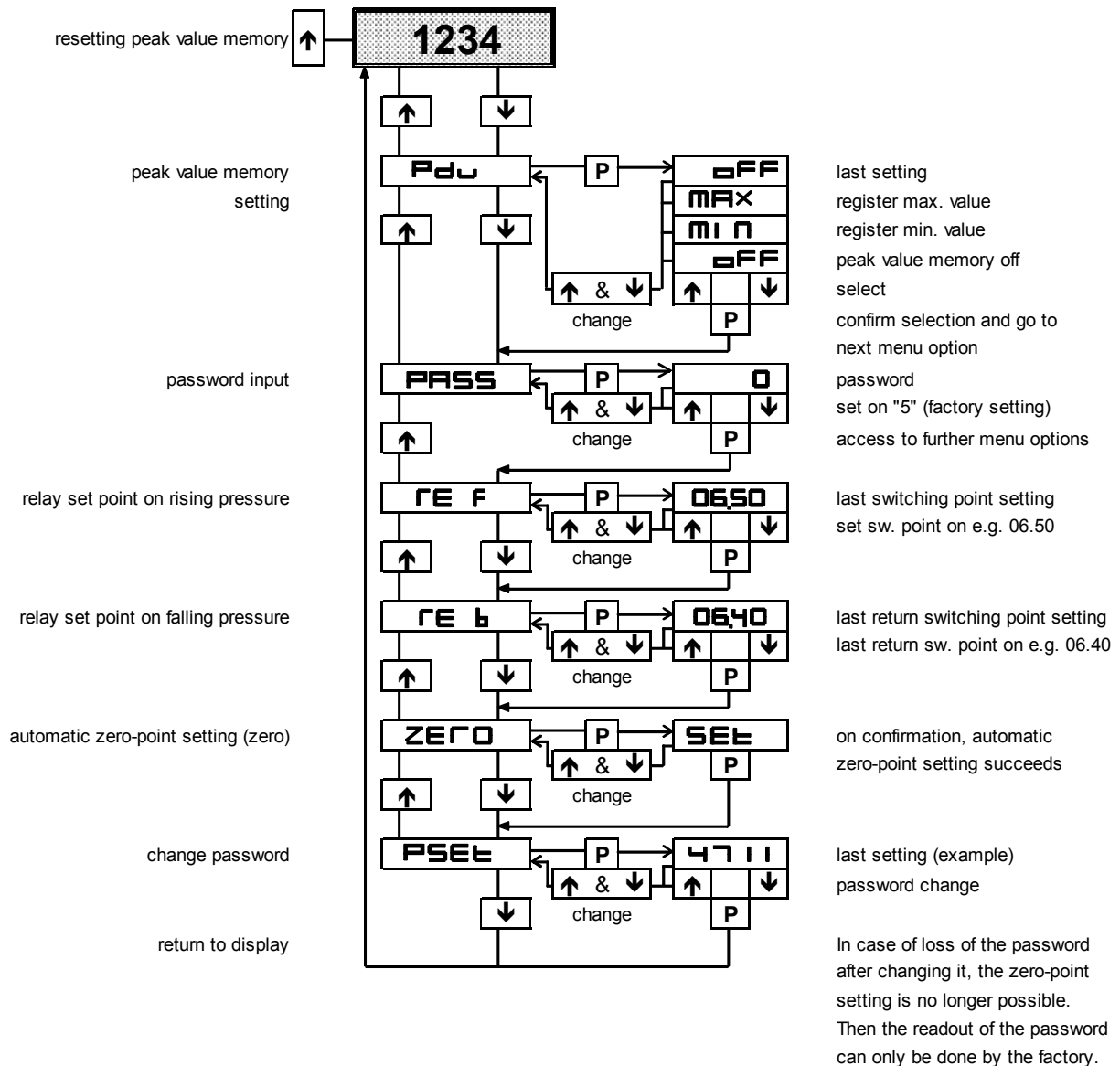


If the peak value memory is activated, the peak value can be reset by pressing the left arrow key.



Note: With the switch-off of the device the peak value memory is reset.

Unit with switching output + peak value memory MAN-LD2S...



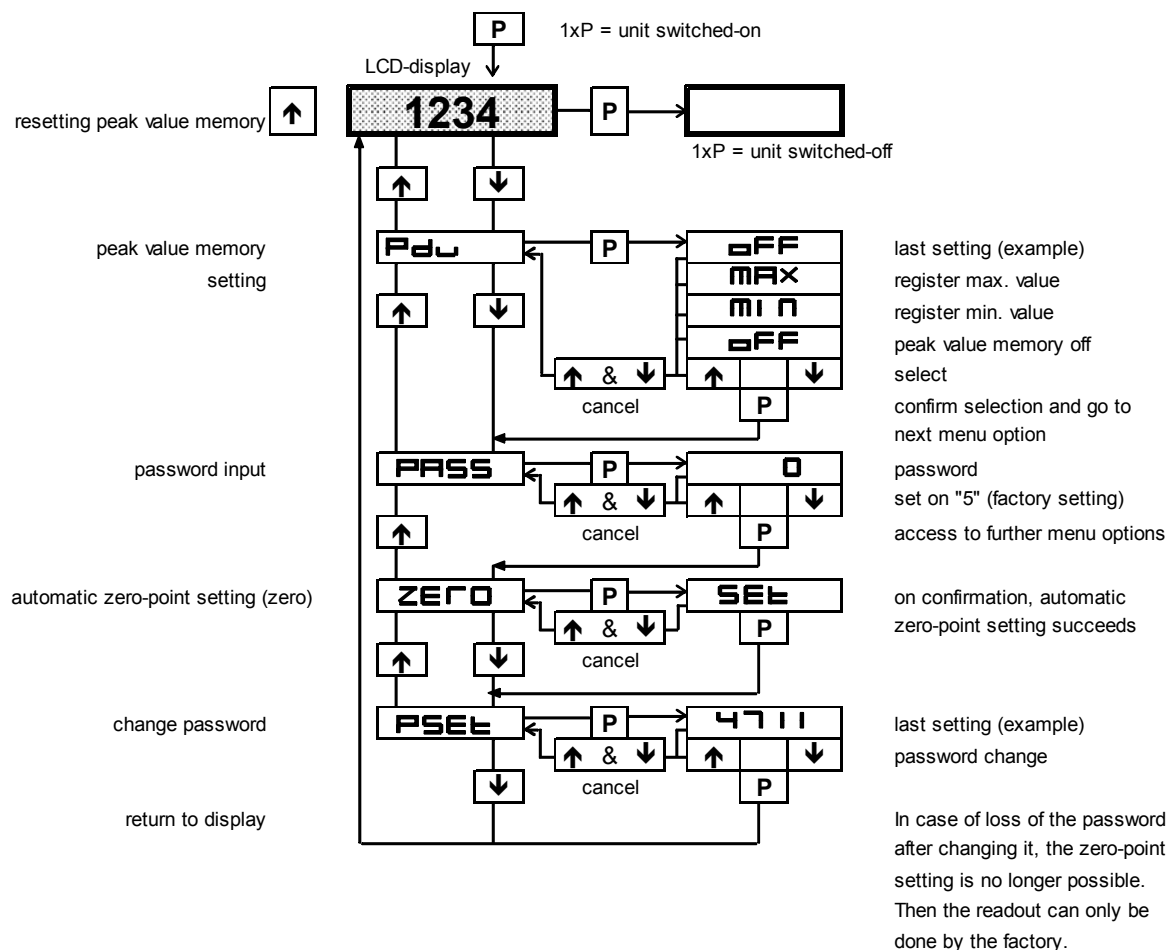
If the peak value memory is activated, the peak value can be reset by pressing the left arrow key.



Note: With the switch-off of the device the peak value memory is reset.

10.2 Control function for MAN-SD

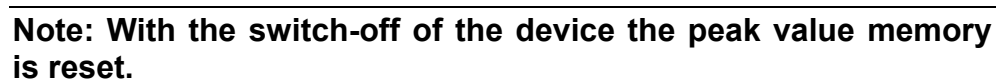
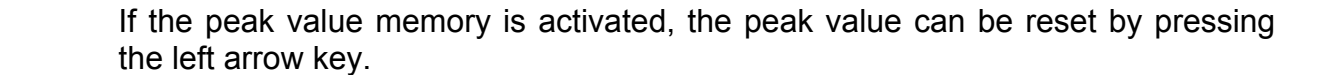
Unit with peak value memory MAN-SD1S... and
unit with peak value memory + analogue output MAN-SD3S...



If the peak value memory is activated, the peak value can be reset by pressing the left arrow key.



Note: With the switch-off of the device the peak value memory is reset.



11. Maintenance

In case, the medium to be measured is not polluted, the unit is maintenance-free.

12. Technical Information

Display:	4-digit LCD, digit height 12.7 mm
Measuring range:	-1...0...+1600 bar (special ranges on request)
Accuracy class:	0,5
Temperature coefficient:	
• Zero-point:	$\leq \pm 0,2\%$ relative to measured value / 10 K
• Range:	$\leq \pm 0,1\%$ relative to measured value / 10 K
Zero point correction:	$\leq \pm 25\%$
Overload range:	3 x P _N (up to 40 bar) 2 x P _N (60 up to 160 bar) 1.5 x P _N (250/400/1000/1600 bar) 1.3 x P _N (600 bar)
Sampling rate:	5 per seconds (standard) (1 up to 10 per seconds can be set ex works)
Housing:	Ø 74 mm, PA6 GK30, polyester film
Wetted parts	
Sensor:	ceramic (Al ₂ O ₃) (MB ≤ 600 bar) stainless steel (1.4571) (MB > 600 bar)
Seal:	NBR (MB ≤ 600 bar)
Process connection:	G 1/4, G 1/2, 1/4 NPT, 1/2 NPT outer thread, (range ≥ 1000 bar only G 1/2 or 1/2 NPT) stainless steel 1.4571 (other connections on request)
Temperature of the medium:	-30...+85 °C
Ambient temperature:	0...+60 °C
Storage temperature:	-30...+80 °C
Allowed relative humidity:	< 90%, non-condensing
Protection:	IP 65
Electrical connection:	M12 x1 round connector or PVC-cable
Cable length:	0.5 m (standard), max. 3 m (only MAN-SD)
Weight:	approx. 350 g

MAN-SD

Power supply: 9 V_{DC} (block batterie, IEC 6 LR 01)

Service life (based on a conversion rate of 5/s):

Operation	Alkaline battery (Duracell® MN1601, Varta® 4922)	Alkaline battery (Ultralife® U9VL-J)
Continuous operation	2000 h	5200 h
Switched-off	7300 h	17300 h

Automatic switch-off times: 2...64 min., (auto off)
can only be set ex works;
0 = inactive (recommended for
analogue or switching output)

Peak value memory: MIN or MAX values,
Reset via keypad

MAN-LD

Power supply: 24 V_{DC} ±20%

Options

Limit value relay: NO contact, bistable,
any setting possible,
settable hysteresis

Max. switching power: 30 V_{AC/DC}, 2 A (for relay output)

Analogue output: MAN-SD: 0 - 2 V_{DC}
(working resistance: ≥ 100 kΩ)
MAN-LD: 4-20 mA
(working resistance: < 500 Ω,
galvanically not separated)

13. Order Codes

(Order details: **MAN-SD1S 5 AD 0**)

Version	Power supply	Model	Mechanical connection*	Measuring range*	Electrical connection
Standard	9 V Batterie	MAN-SD1S...	5 = G 1/4 AG 6 = G 1/2 AG R = 1/4 NPT AG S = 1/2 NPT AG	AD = -1...0 bar A1 = -1...+1,5 bar A2 = -1...+3 bar A3 = -1...+5 bar A4 = -1...+9 bar A5 = -1...+15 bar B1 = 0...+0,6 bar B2 = 0...+1 bar B3 = 0...+1,6 bar B4 = 0...+2,5 bar B5 = 0...+4 bar B6 = 0...+6 bar B7 = 0...+10 bar B8 = 0...+16 bar B9 = 0...+25 bar B0 = 0...+40 bar C1 = 0...+60 bar C2 = 0...+100 bar C3 = 0...+160 bar C4 = 0...+250 bar C5 = 0...+400 bar C6 = 0...+600 bar D7 = 0...+1000 bar D8 = 0...+1600 bar	0 = none
Relay output	9 V Batterie	MAN-SD2S...			S = connector M12x1
Output 0-2 V	9 V Batterie	MAN-SD3S...			K =0,5 m cable
Standard	24 VDC	MAN-LD1S...			S = connector M12 x 1
Relay output	24 VDC	MAN-LD2S...			
Output 4-20 mA	24 VDC	MAN-LD3S...			

*Please specify other connections (7/8 UNF for refrigeration technology, M16, etc.) and special measuring ranges in plain text.

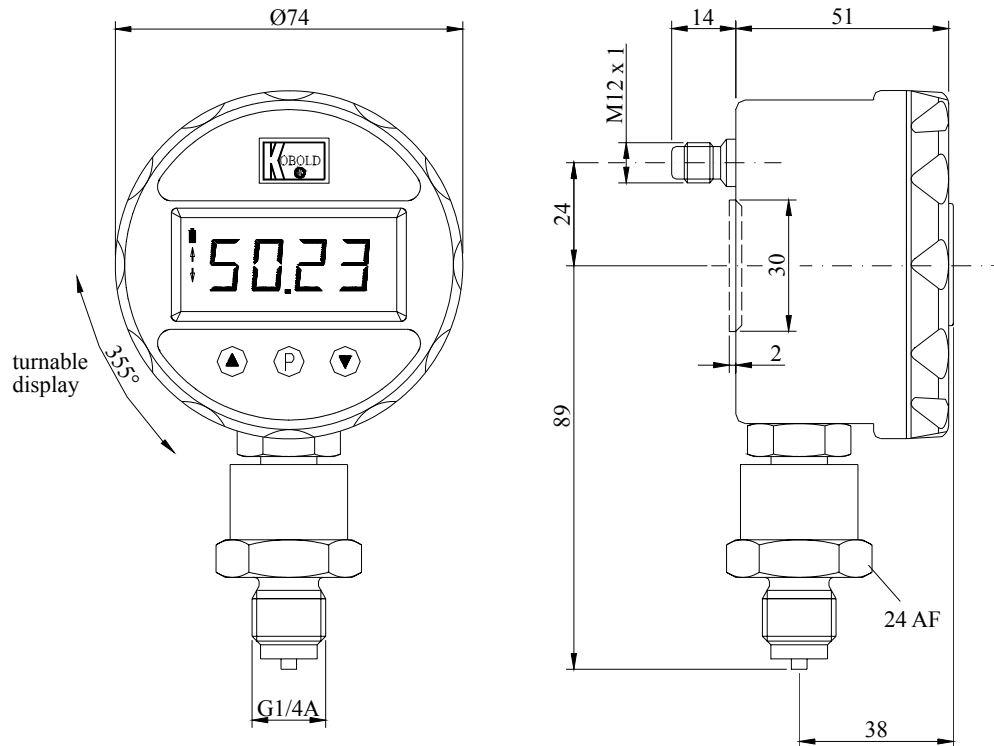
Measuring ranges up to 1000 bar are preferable completed with process connections G1/2, 1/2 NPT or M16 female thread!

Order details (continued)

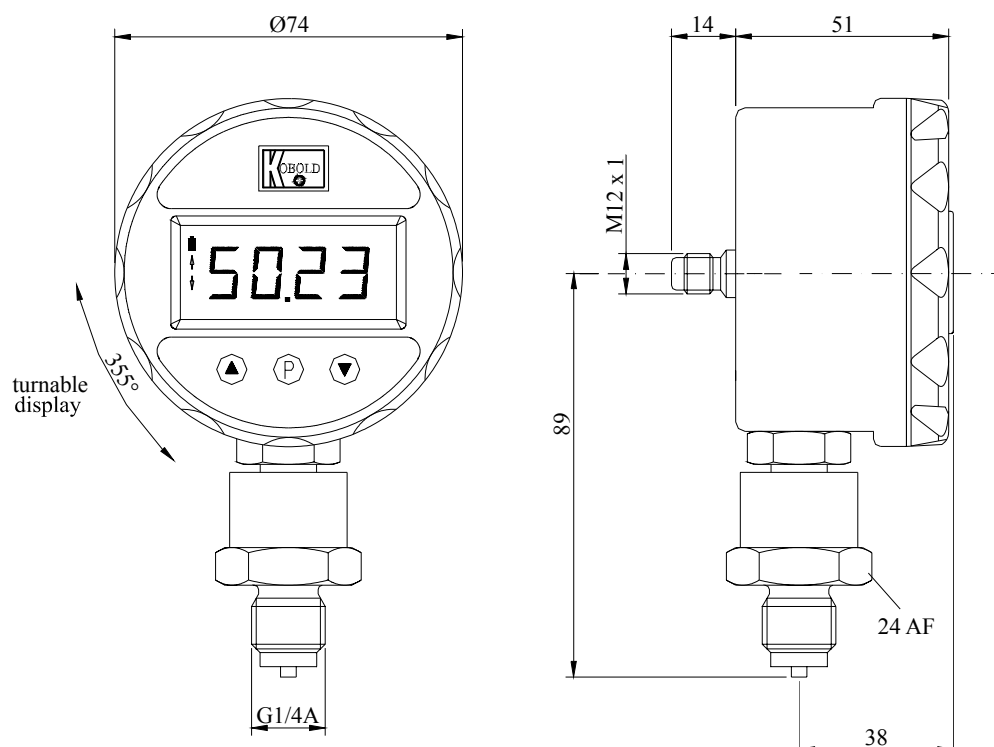
Automatic switch-off times	Other options (please specify in plain text)
<i>without</i> = continuous operation (standard except MAN-SD1) B = 4 minutes C = 8 minutes (standard MAN-SD1) D = 16 minutes E = 32 minutes F = 64 minutes	display in mbar, PSI, hPa etc. conversion rate 1-10 pro sec.

14. Dimensions

MAN-SD



MAN-LD



15. Declaration of Conformance

We, KOBOLD Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Digital Manometer

to which this declaration relates is in conformity with the standards noted below:

Model: MAN-LD...

EN 61326-A1 2004-05

EMC-requirement Electrical equipment for measurement, control and laboratory use, industrial range (High Frequency Field: 3 V/m)

EN 61010-1 1994.03

Safety requirements for electrical measuring, control and laboratory instruments

Model: MAN-SD...

EN 50081-1.2 1994.03

Electromagnetic compatibility - Fundamental Discipline / Standard Noise Emission

EN 61326-1 1998.01

EMC-requirement Electrical equipment for measurement, control and laboratory use

EN 61010-1 1994.03

Safety requirements for electrical measuring, control and laboratory instruments

Also the following EEC guidelines are fulfilled:

2004/108/EC EMC Directive

97/23/EC PED

Category I, Diagram 1, Vessel, Gases, Group 1 dangerous fluids

Hofheim, 16. Jan. 2007



H. Peters
General Manager



M. Wenzel
Proxy Holder